Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band	)	ET Docket No. 13-49

REPLY COMMENTS OF 5GAA

The 5G Automotive Association ("5GAA")[1] is pleased provide the Office of Engineering and Technology with the following reply comments in response to the *Public Notice* seeking comment on Phase I testing of prototype Unlicensed National Information Infrastructure ("U-NII") devices in the 5.850-5.925 GHz ("5.9 GHz") frequency band.[2]

The record demonstrates that there have been two significant developments since the 2016 announcement of the current three-phase testing plan: (1) the advent of Cellular Vehicle-to-Everything ("C-V2X") technology and (2) near term opportunities for unlicensed use in the 6 GHz band. First, C-V2X is a modern standards-based communications system that represents an evolution in connected vehicle technology and the first step towards leveraging 5G to increase safety on America's roads. While the initial standard incorporating C-V2X features was not finalized until after the current three-phase test plan was developed, C-V2X is today's best opportunity to further the vision for Intelligent Transportation System ("ITS") services in the 5.9 GHz band. 5GAA thus intends to file a petition for rulemaking in the near future requesting that

[1] These reply comments reflect the views of 5GAA, and do not necessarily reflect the views or positions of each of the individual members of 5GAA.

[2] *Office of Engineering and Technology Requests Comments on Phase I Testing of Prototype U-NII-4 Devices*, Public Notice, ET Docket No. 13-49, DA 18-1111 (Oct. 29, 2018) ("*Public Notice*").

the Federal Communications Commission ("Commission") initiate a proceeding to modify its 5.9 GHz band rules to enable C-V2X operations in this band.

Second, the recent adoption of the *6 GHz NPRM* demonstrates that the 6 GHz band – and not the 5.9 GHz band – currently represents the best opportunity for identifying new mid-band spectrum for unlicensed use.[3] Indeed, the 6 GHz band presents the Commission with an opportunity to identify much more mid-band spectrum for unlicensed use than that available in the 5.9 GHz band.

In light of 5GAA's imminent request for rule changes to allow for C-V2X operations in the 5.9 GHz band, there ultimately may be a need to modify the current three-phase test plan. During the course of completing the three-phase test plan, the Commission should focus its efforts to identify new mid-band spectrum for unlicensed use on the 6 GHz band. Similarly, a need to modify the test plan should not be misconstrued as a reason to abandon phases two and three of the test plan. All three phases of the test plan should be completed before any conclusions are reached as to whether unlicensed devices can safely operate in the 5.9 GHz band—regardless of the connected vehicle technologies authorized for use.

I. 5GAA IS A RAPIDLY GROWING GLOBAL CROSS-INDUSTRY ASSOCIATION THAT BRINGS TOGETHER THE TELECOMMUNICATIONS, TECHNOLOGY, AND AUTOMOTIVE INDUSTRIES

5GAA is a global cross-industry association of companies from the telecommunications, technology, and automotive industries working together to develop end-to-end connectivity solutions for intelligent transportation, future mobility systems, and smart cities. Created in 2016 by eight founding members, 5GAA's membership has expanded rapidly and now includes over

[3] *Unlicensed Use of the 6 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 18-295, FCC 18-147 (rel. Oct. 24, 2018) ("*6 GHz NPRM*").

100 companies from around the world. Today, 5GAA's members include mobile network operators, telecommunications infrastructure vendors, chipset manufacturers, automotive manufacturers, and tier-1 automotive suppliers.

II. THERE HAVE BEEN TWO SIGNIFICANT DEVELOPMENTS SINCE THE 2016 ANNOUNCEMENT OF THE THREE-PHASE TEST PLAN: THE ADVENT OF CELLULAR VEHICLE-TO-EVERYTHING TECHNOLOGY AND UNLICENSED OPPORTUNITIES IN THE 6 GHZ BAND

For decades, Congress, the Department of Transportation ("DOT"), and the Commission have acknowledged the life-saving and societal benefits of connected vehicle technologies. In 1999, the Commission adopted an allocation in the 5.9 GHz band for the ITS radio service.[4] In the *Allocation Report and Order*, the Commission found that the ITS allocation would "further the goal of the United States Congress and the Department of Transportation to improve the efficiency of the Nation's transportation infrastructure and will facilitate the growth and development of the ITS industry."[5] Four years later, the Commission adopted service rules limiting ITS operations in the 5.9 GHz band to those that use the Dedicated Short Range Communications ("DSRC") standard—the only short-range vehicular ITS technology available at the time.[6]

In 2013, the Commission proposed rules that would allow unlicensed devices to share the 5.9 GHz band.[7] As the Commission noted at the time, the proposal was based in part on a desire

[4] *See Amendment of Parts 2 and 90 of the Commission's Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services*, Report and Order, 14 FCC Rcd 18221 (1999) ("*Allocation Report and Order*").

[5] *Id.* at 18221 ¶ 1.1.

[6] *Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz) Band et al.*, Report and Order, 19 FCC Rcd 2458 (2004).

[7] *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, 28 FCC Rcd 1769 (2013).

to increase the amount of mid-band spectrum available to unlicensed use.[8] In 2016, the Commission released a public notice announcing, among other things, its plan to conduct, in coordination with the DOT and the National Telecommunications and Information Administration, a three-phase collaborative testing plan to further explore sharing solutions between unlicensed devices and DSRC operations in the 5.9 GHz band.[9]

Yet, as the record reflects, since the announcement in 2016 of the three-phase testing plan, there have been two significant developments that warrant consideration in this proceeding. These developments are the advent of C-V2X and near term opportunities for unlicensed use in the 6 GHz band.[10]

A. C-V2X – a Next-Generation Connected Vehicle Technology Designed for the 5.9 GHz Band – Represents the Best Opportunity to Further the Vision of ITS in the 5.9 GHz Band

C-V2X is a modern standards-based communications system that represents an evolution in connected vehicle technology and the first step towards leveraging 5G to increase safety on America's roads. C-V2X enables direct, peer-to-peer mode communications between vehicles themselves ("V2V"), vehicles and vulnerable persons such as pedestrians and cyclists ("V2P"), and vehicles and transportation infrastructure ("V2I"), as well as communications between vehicles and mobile networks ("V2N"). These communications can help enable important improvements in safety, traffic efficiency, mobility, and energy efficiency on America's roads.

[8] *Id.* at 1770 ¶ 2.

[9] *See The Commission Seeks to Update and Refresh the Record in The "Unlicensed National Information Infrastructure (U-NII) Devices in The 5 GHz Band" Proceeding*, Public Notice, 31 FCC Rcd 6130 (2016) ("*U-NII-4 Public Notice*").

[10] *See, e.g.*, Comments of OmniAir Consortium, Inc., ET Docket No. 13-49, at 6-7 (Nov. 28, 2018) ("OmniAir Comments") (discussing the development of C-V2X and the *6 GHz NPRM*).

The standards process for C-V2X had not yet been completed when the Commission, the DOT, and the Department of Commerce initially foreshadowed the three-phase test plan nearly three years ago.[11] Indeed, the 3rd Generation Partnership Project's Release 14, which specified C-V2X features based on the 4G LTE-Pro system, was not finalized until June of 2017.[12]

Today, however, C-V2X represents the best opportunity to further the vision for ITS services in the 5.9 GHz band. Recent testing performed by 5GAA members – and submitted to the Commission as an appendix to 5GAA's Petition for Waiver – demonstrates that C-V2X peer-to-peer mode consistently outperforms DSRC in several key areas.[13] These performance advantages, which include enhanced reliability over an extended range, better non-line-of-sight performance, and greater resiliency, can – both individually and as a complement to existing radar- and camera-based systems – provide vehicles and drivers with an earlier, more complete picture of the surrounding road environment.

The performance advantages of C-V2X are particularly important in non-line-of-sight scenarios (e.g., around corners, through large trucks, etc.). Because current and near-term in-vehicle camera and sensor-based technologies experience limitations in these scenarios, C-V2X's non-line-of-sight performance advantage shall allow vehicles to perceive and provide earlier warnings of threats currently hidden from detection today. These warnings are particularly useful near intersections and in highway passing and braking scenarios.

[11] *See* Letter from Anthony Foxx, Secretary, DOT, Penny Pritzker, Secretary, U.S. Dept. of Commerce, and Tom Wheeler, Chairman, FCC to Senators John Thune, Cory A. Booker, and Marco Rubio (Jan. 12, 2016) ("2016 Testing Letter").

[12] While the Release 14 version of LTE was the first cellular standard to incorporate C-V2X technology, work already is underway to develop 5G C-V2X in 3GPP Release 16, which is expected to be completed next year.

[13] *See* 5G Automotive Association Petition for Waiver, GN Docket No. 18-357, App. B (filed Nov. 21, 2018) ("C-V2X Waiver Petition").

C-V2X's V2N mode communications offer additional benefits. For example, V2N mode communications provide the ability to offload less time-sensitive V2V, V2I, and V2P communications to a cellular network during times of peak congestion—further improving C-V2X's performance advantages over DSRC. In addition, C-V2X's V2N mode will allow vehicles to unlock a host of new applications by enabling communications with almost anyone at any time. This V2N mode functionality would allow, for example, integration with smart-city and other connected transportation initiatives that also use cellular technology.

C-V2X is also designed with an upgrade path to 5G. Over the next several years, C-V2X will unlock the power of 5G technologies, driving further improvements in performance, introducing new capabilities to connected vehicles and infrastructure, and extending the number of use cases for C-V2X. For example, 5G C-V2X is expected to complement and augment advanced driving applications that help to coordinate the behaviors of vehicles.[14]

These capabilities are amplified by C-V2X's unique cost efficiency, which supports an accelerated timeline for deployment for this technology. As automotive manufacturers increasingly equip vehicles with cellular modem chipsets, C-V2X can be economically integrated into vehicles. In addition, C-V2X can re-use existing and planned commercial mobile infrastructure in certain situations, leveraging both today's cellular network and tomorrow's 5G networks to reduce infrastructure deployment costs. Further, C-V2X's evolutionary, backwards compatible path to 5G, combined with the growing momentum towards the adoption of C-V2X internationally, will accelerate the development of a market for this technology, creating

[14] To be clear, the immediate benefits of C-V2X do not require waiting on 5G. As previously mentioned, 5GAA's testing demonstrates that 4G LTE-based C-V2X peer-to-peer mode consistently outperforms DSRC in several key areas.

economies of scale and driving down costs. For example, the Chinese Ministry of Industry and Information Technology recently allocated spectrum for C-V2X operations in China.[15]

In light of these capabilities, 5GAA recently filed the C-V2X Waiver Petition requesting permission for the deployment of C-V2X technology in the 5.905-5.925 GHz range of the 5.9 GHz band.[16] As indicated in the C-V2X Waiver Petition, 5GAA plans to file in the near future a petition for rulemaking requesting that the Commission initiate a proceeding to modify its rules for the 5.9 GHz band to allow for C-V2X operations in a broader portion of the band.[17]

B. The 6 GHz Band Represents the Most Promising Opportunity for Identifying Large Amounts of New Spectrum for Near-Term Unlicensed Use

While the 5.9 GHz band may have represented at one point the most promising opportunity for realizing unlicensed use in additional spectrum, the record confirms that this is no longer the case. Today, that distinction belongs to the 6 GHz band. Indeed, the 6 GHz band represents the most promising opportunity for near term unlicensed use in large amounts of new spectrum.

First, with respect to timing, the adoption of the *6 GHz NPRM* in October of this year presents the Commission with the opportunity to make this band available for unlicensed use in the very near future.[18] Even under a conservative timeline, it is realistic to expect that the Commission will be able to adopt final rules for unlicensed use of this band in 2019.

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[15] *See* Ministry of Industry and Information Technology of the People's Republic of China, MIIT (2018) No. 203 regulation (Nov. 2018). *See also* Stephen Lawson, *C-V2X's Momentum in China May Drive Connected-Car Development*, TU Automotive (Nov. 7, 2018), https://www.tu-auto.com/c-v2xs-momentum-in-china-may-drive-connected-car-development/.

[16] C-V2X Waiver Petition at 1.

[17] *Id.* at 2.

[18] *6 GHz NPRM*, *supra* note 3.

Second, with respect to the amount of spectrum, the 6 GHz band presents an opportunity to realize an unprecedented amount of new mid-band spectrum for unlicensed use. The *6 GHz NPRM* proposes to allow unlicensed use in portions of 1200 MHz of spectrum.[19] By comparison, most of the interest in unlicensed use in the 5.9 GHz band is focused on the bottom 45 MHz of the band, i.e., the 5850-5895 MHz portion of the band. In other words, the 1200 MHz of spectrum available for unlicensed use in the 6 GHz band represents 25 times more bandwidth than the 45 MHz in the 5.9 GHz band.

III. IN LIGHT OF THESE DEVELOPMENTS, ANY FUTURE ACTIONS THE COMMISSION TAKES IN THIS PROCEEDING SHOULD REFLECT THE LIKELY INTRODUCTION OF C-V2X OPERATIONS IN THE 5.9 GHZ BAND

ITS stakeholders have reached an inflection point regarding the preferred ITS technology in the 5.9 GHz band. As previously explained, C-V2X technology offers capabilities that can enable new and improved ITS services, featuring a cost efficiency that supports an accelerated timeline for deployment, and presents a path to 5G that will greatly expand and enhance C-V2X services in the future. In short, C-V2X is poised for near term deployment, which will further enable the safety, efficiency, and other societal benefits envisioned by the Commission when it adopted the ITS allocation.

To accelerate the realization of the expected benefits from C-V2X services, 5GAA has filed the previously-referenced C-V2X Waiver Petition to allow for the near-term deployment of C-V2X technology in the upper 20 MHz of the 5.9 GHz band. In the very near future, 5GAA intends to file a complementary petition for rulemaking requesting that the Commission initiate a proceeding to modify its 5.9 GHz band ITS rules to provide stakeholders the flexibility to take the evolutionary leap forward in connected vehicle technologies enabled by 5G C-V2X.

[19] *Id.* ¶ 1.

Consequently, 5GAA urges the Commission to account for these developments when considering any future actions it may take in this proceeding.

As the record reflects, there ultimately may be a need to modify the current three-phase test plan.[20] This is not surprising. Indeed, in foreshadowing the three-phase test plan in 2016, the Commission, the DOT, and the Department of Commerce recognized that future modifications might be necessary due to subsequent events.[21] The Commission's subsequent Public Notice confirmed that future adjustments to this three-phase plan might be needed.[22]

During the course of completing the three-phase test plan, the Commission should focus its efforts to identify new mid-band spectrum for unlicensed use on the 6 GHz band. Similarly, a need to modify the test plan should not be misconstrued as a reason to abandon phases two and three of the test plan prior to allowing unlicensed use in the band. As the Commission recognized in 2016, and as the record reflects, the three phases of the test plan are interdependent.[23] It is therefore imperative that all three phases of the test plan are completed before any conclusions are reached as to whether unlicensed devices can safely operate in the 5.9 GHz band—regardless of the ITS technologies authorized for use.

[20] *See* Comments of Cisco Systems, Inc., ET Docket No. 13-49, at 6-8 (Nov. 28, 2018) (discussing the incorporation of C-V2X technology into the three-phase test plan); OmniAir Comments at 7 ("OmniAir cautions the Commission not to take any actions in this proceeding that would prematurely prevent C-V2X development and deployment….").

[21] *See* 2016 Testing Letter, *supra* note 11.

[22] *U-NII-4 Public Notice* at 6139 ("The FCC, in consultation with the DoT and NTIA, will continue to collaborate, as well as engage with other stakeholders, and may make adjustments to the plan as it evolves.").

[23] *See id.* ("The three phases of the test plan are interdependent."); Alliance of Automobile Manufacturers, ET Docket No. 13-49, at 2-3 (Nov. 28, 2018); Comments of General Motors Co., ET Docket No. 13-49, at 4-5 (Nov. 28, 2018); Comments of the Intelligent Transportation Society of America, ET Docket No. 13-49, at 3 (Nov. 28, 2018); OmniAir Comments at 1-2; Comments of Panasonic Corp. of North America, ET Docket No. 13-49, at 2, 6-9 (Nov. 28, 2018); Comments of Safety Spectrum Coalition, ET Docket No. 13-49, at 2 (Nov. 28, 2018); Comments of the Truck & Engine Manufacturers Ass'n, ET Docket No. 13-49, at 2 (Nov. 28, 2018).

IV. CONCLUSION

The record demonstrates that there have been two significant developments since the announcement of the current three-phase testing plan: (1) the advent of C-V2X and (2) near term opportunities for unlicensed use in an unprecedented amount of spectrum in the 6 GHz band. Given these developments, there ultimately may be a need to modify the current three-phase test plan. During the course of completing the three-phase test plan, the Commission should focus its efforts to identify new mid-band spectrum for unlicensed use on the 6 GHz band. Similarly, a need to modify the test plan should not be misconstrued as a reason to abandon phases two and three of the test plan and allow unlicensed use in the band. All three phases of the test plan should be completed before any conclusions are reached as to whether unlicensed devices can safely operate in the 5.9 GHz band—regardless of the ITS technologies authorized for use.

Respectfully submitted,

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